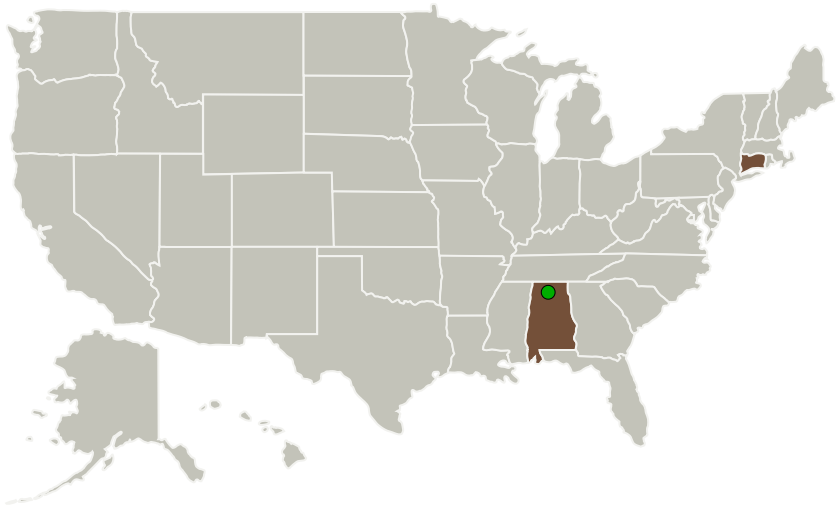
Software Tools for Fault Management Technologies, Phase I

Completed Technology Project (2012 - 2012)

Project Introduction

System autonomy is a key enabler for satisfying complex mission goals, enhancing mission success probabilities, as well as safety at a reduced cost. Fault Management (FM) is one of the most crucial components of system autonomy. NASA has come up with an FM Handbook that provides requirements, rules and guidelines for improving the FM design, development, verification & validation and operations processes. However, adherence to FM directives for realizing the above mentioned goals necessitates aid from advanced software tools. These tools should be able to model a system (during the design phase) from the FM perspective, support various design evaluation and validation activities, identify shortcomings or inconsistencies in the designs, and aid FM design updating/revision. During the operational phase, these tools should perform fault detection, diagnostics, and prognostics; assess functional capabilities of various systems; provide actionable decisions for health management; facilitate optimal troubleshooting and maintenance; and assess probabilities of individual mission objective satisfaction and overall mission success. QSI's TEAMS (Testability Engineering and Maintenance System) SW suite already hosts a number of these desired capabilities. Consequently, QSI proposes to introduce additional modeling and analytic capabilities to TEAMS and enhance the existing, so as to make it an effective support tool for FM.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Qualtech Systems, Inc.	Lead Organization	Industry Minority-Owned Business, Small Disadvantaged Business (SDB)	Rocky Hill, Connecticut
Marshall Space Flight Center(MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama

Primary U.S. Work Locations	
Alabama	Connecticut

Project Transitions

February 2012: Project Start

August 2012: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140332)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Qualtech Systems, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Sudipto Ghoshal

Co-Investigator:

Sudipto Ghoshal

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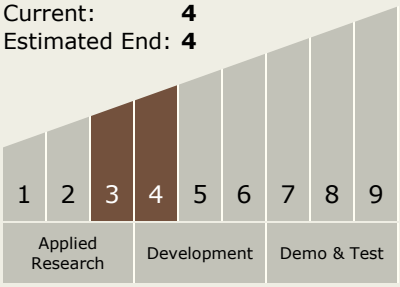
Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



Technology Areas

Primary:

- TX11 Software, Modeling, Simulation, and Information Processing
  - TX11.1 Software Development, Engineering, and Integrity
    - TX11.1.4 Operational Assurance

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System